PHOTOGRAPHIC IDENTIFICATION OF STREAM MACRO-FAUNA: A MINIMALLY DESTRUCTIVE SAMPLING TECHNIQUE.

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Sampling of streams typically involves the removal and preservation of fauna for subsequent identification and enumeration in the laboratory (e.g. Storey et al., 1990). Such methods, however, might not be appropriate in studies of temporal changes in small stream communities because they alter the composition of the communities under investigation. Observed differences in subsequent samples may therefore reflect changes precipitated by earlier sampling activity as well as natural alterations in community structure.

The following method has been developed to identify and enumerate stream macro-fauna from photographs, permitting animals to be released alive after photography. A search of the literature did not reveal any references to this method of sampling stream macro-fauna.

Live specimens are picked from associated debris by hand, placed in a white perspex tray (measuring 14.5 × 10cm with clear perspex sides 2cm high), covered with water and photographed. The base of the tray has been roughened to reduce reflections and a small scale bar glued to one side to permit measurement of animals. An SLR camera fitted with 50mm lens and 12mm extension ring is loaded with ISO 50/188 transparency film. This lens combination produces an image magnification of × 0.25 at which the specimen tray fills the field of view. A small cross in the centre of the tray permits rapid alignment and focusing. Illumination is by two electronic flash guns (Guide Number 15m @ ISO 100) mounted on small tripods, one at approximately 20cm from either end of the tray and aimed at its centre. One flash is synchronised to the camera's shutter via its coaxial socket by a synchronising cable, while the second is automatically discharged by a built-in photovoltaic slave cell when the first is fired. Exposure is calculated with an electronic flash meter. An aperture half a stop larger than indicated is used to compensate for the light-reducing effect of the extension ring.

Photographic transparencies of the samples are later projected onto sheets of white paper for identification and enumeration of the fauna. At times, to aid identification, it is necessary to view some transparencies under a dissecting microscope with sub-stage illumination.

Photographic sampling is being used to study temporal changes in the macro-fauna of pools in small rainforest streams. Photographs of animals from several habitats at twelve sites in two streams are taken monthly. Examples of species that have not previously been encountered, or that are difficult to identify, are preserved for later comparison with voucher specimens. Thus sampling is not totally without effect on the community, but it is considerably less destructive than it would be if all animals were killed.

Taxonomic resolution obtainable from photographed samples is often not as high as can be achieved from conventional preserved samples. This obstacle is considerably reduced when the fauna studied is well known and a reference collection of preserved specimens is available for comparison with photographed specimens. In the present study, for example, 64 of the 78 taxa recorded (82%) can be identified to species from photographs and most of the remainder can be identified to genus or family. However, the photographic sampling method is not suitable for samples where the animals are not readily separated from associated debris.

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Literature cited

Storey, A.W., Bunn, S.E., Davies, P.M. & Edward, D.H. 1990. Classification of the macroinvertebrate fauna of two river systems in Southwestern Australia in relation to physical and chemical parameters. Regulated Rivers: Research & Management 5: 217-232.

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